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CANINE TRACHEO-BRONCHITIS DUE TO INFECTION WITH *FILAROIDES OSLERI*

BY

G. M. URQUHART, W. F. H. JARRETT

AND

J. G. O'SULLIVAN

THE UNIVERSITY OF GLASGOW VETERINARY SCHOOL

INTRODUCTION

There are few recent recorded cases of canine tracheobronchitis due to *Filaroides osleri* infection (Pillars, 1935; Hare, 1930; Hopkirk, 1928; Joest, 1924; Kitt, 1923; Hall, 1921; Travassos, 1921). Most of these cases have occurred in kennels and have involved both bitch and litter, the predominant symptom being chronic paroxysmal coughing. Due to the lack of details of the morphology and life cycle of the parasite, its zoological classification is uncertain, and no rational method of treatment or control has been described. The present communication describes an outbreak in a kennel consisting of several breeds of hounds. Special attention is given to the morphology of the parasites and the lesions produced; a transmission experiment is described.

THE HISTORY OF THE OUTBREAK

The details given below were furnished by Mr. J. Burns, M.R.C.V.S., of Annan. The dogs involved were greyhounds which were housed in the same building as, but in different kennels from, a pack of otterhounds. All the dogs in the kennel were exercised in one paddock adjacent to the buildings. The standard of hygiene in the kennels was poor.

The affected greyhounds comprised two successive litters from one bitch; the bitch was bred at the kennels, and left it on only two occasions when sent to England for service.

The first litter of five pups was born in January, 1951, and in August of the same year one pup developed dyspnoea which lasted for several months. The litter was then sold, and no further history is available.

The second litter of four pups was born in January, 1952, and all of these developed respiratory symptoms seven months later. The pups showed mild pyrexia and occasional attacks of acute respiratory distress; these latter occurred especially after exercise or handling, when the animals stood in the air hunger position, with necks fully extended. Paroxysmal coughing followed by vomiting also occurred. Their appetite was fairly good, and the dogs remained quite bright in behaviour, despite a chronic cough and a deterioration in condition. One pup developed subcutaneous emphysema on two separate occasions.

Two of the pups were autopsied by the veterinary surgeon, who submitted to the laboratory the trachea of one for confirmation of his diagnosis of *F. osleri* infection.

The bitch did not show respiratory symptoms at any time. The remaining two pups of the litter were sent alive to the animal hospital for examination. No additional symptoms were noted. Each pup was anaesthetised with thiopentone intravenously, and a bronchoscope introduced into the trachea. In each case about the bifurcation of the trachea, grey nodules with small depressions on the surface could be observed partially obstructing the lumen. These bled readily on manipulating the bronchoscope. Pieces of adult nematode and larvae were isolated from swabs taken from the surface of these masses. Living larvae were found in the fresh faeces of the pups, and these are described below.

A short time after admission to the hospital, the pups developed circling movements, and eventually became paraplegic; a diagnosis of distemper was made, and the animals were destroyed.

PATHOLOGY

The Macroscopic Lesions

The main lesions (Fig. 1) are situated immediately above and below the bifurcation of the trachea, and take the form of raised elongated and slightly pedunculated nodules, their long axes corresponding with that of the trachea. They range in size from miliary nodules to plaques measuring $\frac{3}{4}$ inch long, by $\frac{1}{2}$ inch wide, by $\frac{1}{4}$ inch deep. They are grey in colour, but are superficially transparent, so that coiled masses of white worms are easily seen from the surface. There is no ulceration of the mucosa, and there is neither acute bronchitis nor pneumonia.

Microscopic Appearance

The nematodes are present in the tracheal and bronchial walls, both above and below the cartilage, in the peribronchiolar tissue and to a lesser extent in the alveoli. They do not lie free in the lumen of the trachea as does the bovine lungworm. The great majority of mature worms, *i.e.*, those containing larvae, lie in the mucosa and submucosa of the trachea and large bronchi. (Figs. 2 and 3.) The epithelium overlying them is intact. The large nodules contain coiled masses of adult worms and the miliary nodules contain immature worms. (Figs. 2 and 3.)

The adult worms appear to lie in the tissue spaces and lymphatics both above and below the muscularis mucosae. The spaces in which they lie are not lined with epithelium, but are surrounded by a thin fibrous wall. (Fig. 3.) The latter consists of collagen and elastic fibres; no smooth muscle tissue is present. This fibrous wall probably results from compression condensation of the fine fibres normally present in the area. Normal glands are present in the tracheal wall, and these do not contain worms. The mucosal and sub-mucosal tissues are infiltrated with plasma cells and lymphocytes. There is generally no foreign body giant cell reaction or any acute inflammatory change, but at several points in the lymphoid stroma, dead worms are present. These have lost specific staining affinity and only "ghost" outlines of necrotic nematode tissue elements can be seen. A narrow zone of acute inflammatory cells and foreign body giant cells is present around each dead nematode. Many small haemorrhages are present in the tracheal wall. The gravid worms do not appear to have any access to the bronchial or tracheal lumen in the stage of development presented in these cases, although one worm was found with its tail protruding into the lumen.

The nematodes which lie immediately outside the cartilage layer are for the most part immature, only an occasional one containing larvae. These, too, are surrounded by lymphoid tissue. Immature worms are present in the lymphatics accompanying the trachea and small bronchioles, and in the lymphatics of the septa. (Fig. 4.) Worms are not present in the blood vessels. Occasional aggregates of immature worms are present in the alveoli. (Fig. 5.) These are provoking very little cellular reaction, only a few macrophages and lymphocytes being present. At several points in the lung there are small foci of fibrosis, in which are embedded tubules lined by a regular low columnar epithelium. The epithelialisation differs from that usually seen in distemper, in that the lining cells are columnar rather than of a pavement type. Cytoplasmic inclusion bodies of the distemper type are absent from the lung (*cf.* brain). The fibrosis together with presence of many macrophages containing granules of iron, suggests that a few larger worms might have burrowed through the lung substance producing necrotic tracts and small haemorrhages. Microscopical examination of the brain shows severe encephalitis, especially in the thalamus, mid-brain, cerebellum, pons and medulla, the lesions consisting partly of glial reactions and partly of perivascular lymphocytic and plasma cell infiltrations. Demyelination is present mainly in the cerebellum and pons, and there are a few distemper type cytoplasmic inclusion bodies. These changes suggest concurrent distemper infection of at least five weeks' duration. (Campbell, R. S. F., unpublished.)

The Morphology of the Parasite

Adult Male.—The length (of five specimens) varied from 6·5 to 7·0 mm. The buccal cavity was vestigial with no sign of lips. A cuticular collar (Fig. 6) was present 12·6μ to 18·3μ behind the anterior extremity. The thick, flask-shaped oesophagus measured 213·9μ to 252·2μ long. The posterior end of the worm (Fig. 7) was bluntly pointed and non-bursate. A gubernaculum 36·6μ to 51·2μ in length was present and two small equal spicules 99·2μ to 112·8μ long led to the closca 18·3μ to 30·5μ from the posterior end.

Adult Female.—The female was longer and thicker than the male, measuring 10 to 13·5 mm. The buccal cavity was vestigial with no sign of lips. The cuticular collar was present 12·2μ to 25·6μ from the anterior end. The oesophagus measuring 226μ to 248μ in length was similar in shape to that of the male. The uterus, which contained larvae, extended far forward, practically to the oesophageal-intestinal junction. The posterior end (Fig. 8) was deeply cleft, with the anus and vulva opening close together in the cleft.

Larvae.—The first-stage larvae recovered from a bronchial swab measured 232·6μ to 266·6μ in length. The oesophagus, which was rhabditiform, was not seen clearly, but in general was one-third to one-quarter of the total length. The posterior end was pointed and often showed a distinct kink. (Fig. 9.)

Similar though slightly larger larvae (325·5μ to 378·2μ) were recovered from faeces in which they were sluggishly motile. In these the oesophagus was more distinct, measuring from 103·7μ to 111·6μ the posterior bulb being 18·3μ in length.

Transmission Experiment

Since the life cycle of *F. osleri* is unknown, an attempt was made to transmit the condition. Unfortunately, the faeces from the naturally infected pups contained very few larvae. These faeces were kept in a moist atmosphere for seven days, and from them an aqueous suspension containing approximately 300 larvae was made; this was administered orally to one six-week-old pup.

The pup did not show symptoms at any time and repeated faecal examinations were negative. It was killed 60 days after infection, and at autopsy no lesions were found. Microscopical examination of sections taken from several parts of the lung and trachea was made and in one of these (Fig. 10), transverse sections of a nematode were seen immediately exterior to the tracheal cartilage. The worm contained a uterus filled with developing ova. Serial sections failed to reveal larvae in the uterus of the worm.

This degree of sexual maturity eliminates the possibility of the worm being an ancylostome or an ascarid. It is possible that this worm is a *F. osleri;* if this is the case it would appear that the life cycle of *F. osleri* is direct. The chance that the pup was infected before the experiment began is slight.

Discussion

In this outbreak, as in that described by Pillars (1928), the bitch appeared to be the source of infection. The minimum period of time which the larvae take to reach the infective stage is not known, but our transmission experiment suggests that this time is less than seven days. We therefore suggest that the kennel should be cleaned of faeces and the floor disinfected about every three days, where this condition is known to occur. There is no evidence at present for or against pre-natal infection.

Diagnosis rests mainly on the symptomatology and the demonstration of larvae in the faeces. Bronchoscopy may be of help in those cases in which the nodules in the trachea are fairly large. This was the case in our animals, but in some of those recorded by Pillars (1928) the lesions were very small. Such lesions could easily be missed on bronchoscopical examination.

The route of migration of the parasite is unknown. In our cases most of the mature worms were found in the tissue spaces and lymphatics lying immediately deep to the epithelium. Hare (1930) suggested that the worms were lying in the ducts of hypertrophied mucous glands; we found no evidence of this.

The structure of the lesions and the relative positions of the mature and immature worms suggest that the intrapulmonary route of migration is via the lymph stream.

From the details given above *F. osleri* does not appear to belong to either the Metastrongyloidea, mainly because of the complete absence of a bursa, or the Spiruroidea, because of the absence of lips, the presence of a flask-shaped oesophagus and equal similar spicules. In this connection, Neveu-Lemaire (1930) quotes Scrjabin as saying that *F. osleri* links the two orders Metastrongyloidea and Spiruroidea.

It is possible that this condition is more common than is at present appreciated and we suggest that its presence should be considered in outbreaks of coughing in kennels.

Summary

1. An outbreak of canine tracheo-bronchitis due to infection with *F. osleri* is described.

2. Details are given of the morphology of the parasite and the pathology of the lesions.

3. A transmission experiment is described.

Acknowledgments.—We wish to thank Mr. R. S. F. Campbell of this school for his notes on the lesions in the central nervous system, and also Mr. A. Finney for the photographs.

(Continued at foot of col. 1, page 145)

FIG. 1.—Worm nodules in trachea and bronchi.

FIG. 2.—Nodule in trachea showing cross sections of adult worms.

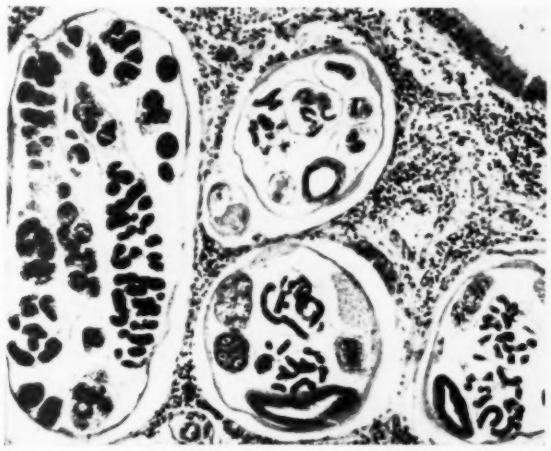

FIG. 3.—Cross sections of adult worms containing larvae.

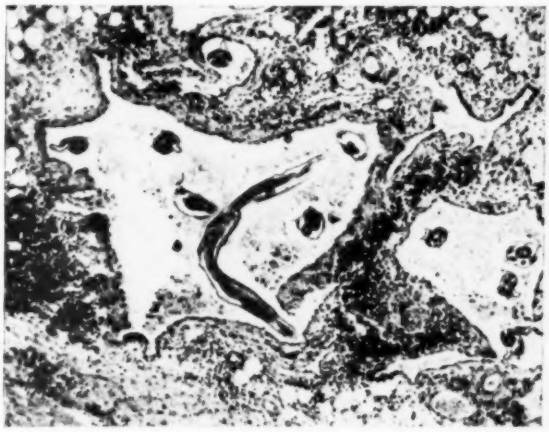

FIG. 4.—Immature worms in peri-bronchial lymphatics.

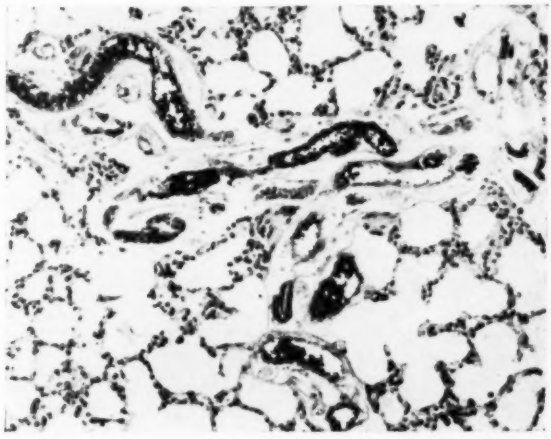

FIG. 5.—Immature worms in alveoli.

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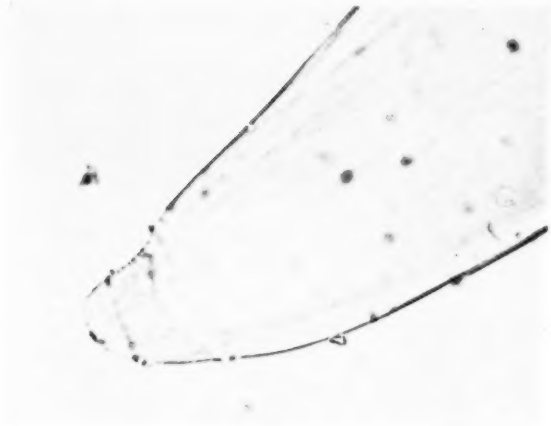

FIG. 6.—Head of adult male.

FIG. 7.—Tail of adult male.

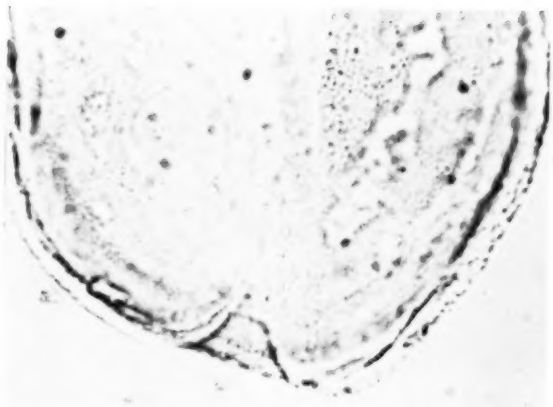

FIG. 8.—Tail of adult female.

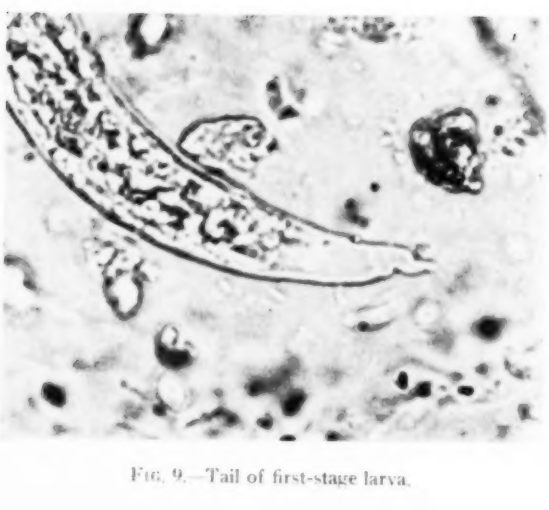

FIG. 9.—Tail of first-stage larva.

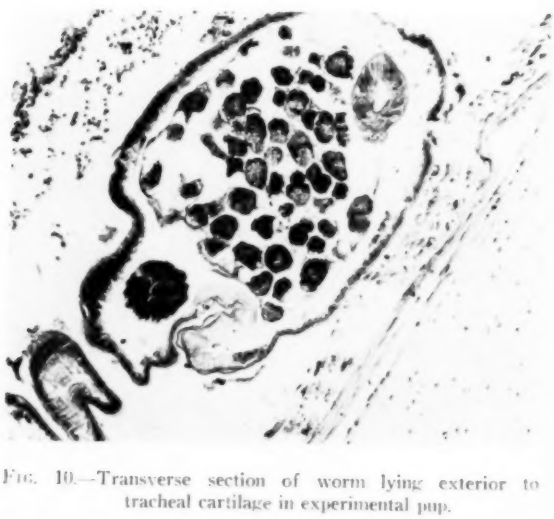

FIG. 10.—Transverse section of worm lying exterior to tracheal cartilage in experimental pup.

CANINE VESICULAR DERMATITIS*

BY

S. JENNINGS

Veterinary Hospital, University of Glasgow

It may be considered extremely presumptuous for any one person to give a name to a disease. Yet if a clinician recognises a syndrome which differs sufficiently to put it in a class by itself and if it occurs in the same form in a sufficient number of patients, then the most logical preliminary step is to give it a distinguishing and preferably descriptive name of its own. This enables the clinician to keep the abnormality clear in his own mind, it gives a label for record purposes, and forms a basis for discussion with his colleagues.

The term canine vesicular dermatitis is therefore suggested for a non-parasitic skin abnormality which hitherto does not appear to have been described in the literature. It appears mostly in adult dogs, is more common in the female, the predilection sites of the lesions are the glabrous parts of the abdomen, and it is characterised by thin-walled vesicles which rupture readily and form characteristic exfoliative squamae.

The following description of the condition is based on the case histories and details of 45 cases.

Symptoms

Pruritis is evident and is the factor which first attracts the attention of the owner to the presence of the lesions. The animal otherwise appears normal in health with no systemic disturbance.

Lesions

These consist of thin-walled shallow vesicles of about 5 to 7 mm. which develop and rupture within 24 hours. The vesicles can easily be missed unless a careful search is made. During the course of the disease there are often occasions when at a given time no unruptured vesicles can be found anywhere on the body and only the lesions formed by ruptured vesicles can be seen.

The vesicle is not turgid and slight pressure on one part will cause a bulge on another and any further pressure will readily cause it to rupture. The vesicle contains a greenish turbid fluid and after rupture the fluid dries to form a scab. This scab soon comes away leaving a roughly circular or irregular area with edges of frayed epidermis (see Figs. 1 and 2). The area then increases in size until it is up to 10 times that of the original vesicle and then this individual lesion heals. The process from vesicle to healing varies in time but takes approximately seven days. It has been difficult to assess the length of time that the skin condition lasts, but the average time is between six weeks and two months. In a few cases an area of pigmentation surrounded by a paler area remains after the lesion is healed. (See Fig. 5.) The pigmentation lasts one or two months and then disappears. The lesion is never a pustule and is therefore quite different from that condition seen in puppies where pustules appear on the glabrous parts of the abdomen.

Predilection Sites of the Lesions

In 74 per cent. of the recorded 45 cases lesions first appear on the glabrous parts of the abdomen. In the early part of the disease lesions were confined to this area but later spread forward to the lower part of the chest wall and to the axillae. After these positions the flank was the next most common site. It was only in several severe cases that lesions spread to the back. (Fig. 3.)

Recurrence of Disease

After the animal has made a complete recovery it is usual for the patient to develop a fresh outbreak of lesions at regular intervals of 6 or 12 months and this appears to be characteristic of the disease. Of the dogs in the present series it was possible to make further records in 24 cases, and Fig. 4 (overleaf) illustrates the recurrence in these animals. An analysis of this recurrence is as follows :—

	Number of animals
Animals recovered and disease reappeared 12 months later	8
Animals recovered and disease reappeared annually for three years	1
Animals recovered and disease reappeared annually for five years	2
Animals recovered and disease reappeared annually for six years	2
Animals recovered and disease reappeared twice yearly for two years	1
Animals recovered and disease reappeared twice yearly for three years	2
Animals recovered and disease reappeared twice yearly for four years	3
Occurred at irregular intervals over periods of one, two, three and four years	4
Occurred once only in 11 years	1
Total	24

In the majority of the above cases it was possible to examine the animals each time the lesions appeared. Where the disease occurred over a number of years, however, the animal was not seen every time and a description of the lesions by reliable owners was accepted as evidence that the condition had occurred. Where it occurred in bitches twice yearly the owners commonly said that it followed oestrus.

Age and Sex Incidence

The average age of animals when the lesions were first observed was 3·6 years. Of 45 affected animals 18, representing 40 per cent., were male, and 27, representing 60 per cent., were female. The preponderance of females over males, however, is much greater than these figures indicate since more male dogs are kept than females. The ratio of males to females in 200 parasitic skin conditions in dogs in Edinburgh was 64 per cent. males to 36 per cent. females. If it can be assumed that parasitic conditions affect both sexes equally this figure might indicate the proportion of male dogs to female that are reared.

Martin (1953) gave an almost identical figure of 64·4 per cent. male and 35·6 per cent. female, based on 500 dogs presented with every type of ailment, in Glasgow.

* Part of a paper presented to the Association of Veterinary Teachers and Research Workers at Liverpool on April 1st, 1953.

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The magnifications of the plates are as follow : Fig. 1 × 2, Fig. 2 × 30, Fig. 3 × 110, Fig. 4 × 50, Fig. 5 × 110, Fig. 6 × 500, Fig. 7 × 500, Fig. 8 × 500, Fig. 9 × 1,000, Fig. 10 × 120.

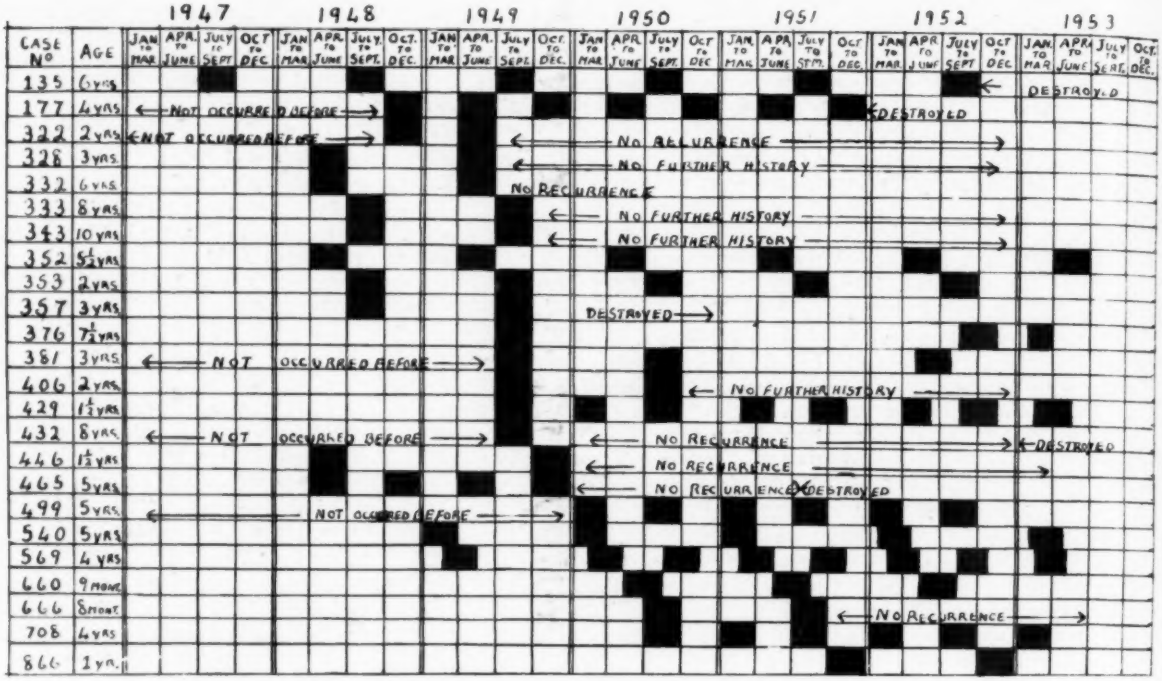

FIG. 4.—Diagram illustrating periods of recurrence in 24 cases. Black areas represent three monthly periods during part of which time the disease persisted.

AETIOLOGY

The lesions following rupture of the vesicles resemble those of ringworm ; but prolonged search in many cases failed to produce any evidence of a fungal infection. In four cases an unruptured vesicle was opened under aseptic conditions and the fluid subjected to bacteriological examination. In each case a haemolytic staphylococcus was isolated but little significance can be placed on this since the same organism appears to be ubiquitous where the skin is concerned and can be recovered from a variety of lesions. The fluid in the vesicles contained no leucocytes and only odd epithelial cells.

The fact that the primary lesion is a vesicle is in itself highly suggestive of a virus origin, and in this respect it is interesting to compare the condition with herpes simplex of human species. This latter condition frequently occurs in women, often near the menstrual period, and is a recurrent disorder (Ormsby & Montgomery, 1948). Its virus origin was demonstrated and first recorded by Löwenstein (1919), who said that Grüter had reproduced the condition in rabbits at an earlier date. Since that date many workers have demonstrated the virus.

Attempts to reproduce the canine condition were made on two occasions using five experimental dogs. Material from unruptured vesicles was mixed with saline and applied to the glabrous parts of the abdomen after scarification. A local reaction resembling the condition occurred in one dog, but no vesicles formed in any of the animals : Löwenstein (1919) mixed the contents of human herpes vesicles with normal saline and applied it to the scarified cornea of rabbits where it produced a herpes keratitis with vesicles. It may well be that a similar or more complicated technique will be required to reproduce the canine condition if, indeed, a virus is implicated.

TREATMENT

A wide variety of remedies was used without success, although lotions of zinc oxide and carbonates with glycerine appeared to allay some of the irritation. In giving a prognosis to the owner it is important that a warning be made, firstly, in regard to the time the condition is likely to persist and, secondly, as to the likelihood of recurrence at regular intervals.

SUMMARY

The term canine vesicular dermatitis is suggested for a skin disorder of adult dogs and seen mostly in females. There are no general symptoms apart from those of irritation. The lesions are primarily vesicles followed by rupture and scab formation and then by expanding areas with shedding epithelium at the periphery. Forty-five cases were recorded in which the predilection sites for lesions were the glabrous parts of the abdomen ; and the disorder recurred at regular intervals in a high proportion of cases. The similarity of the disease to herpes simplex of human species is discussed and it is suggested that the canine condition may also be due to a virus.

Acknowledgment.—I am grateful to Mr. R. S. Hood, A.I.B.P., technician at the Royal Dick School of Veterinary Studies, for the care taken in making the photographs.

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FIG. 1.—Characteristic lesion on the abdomen resulting from ruptured vesicles. Hair has been clipped away from the ventral part of the thorax. Earlier crops of vesicles had appeared on the more posterior part of the abdomen.

FIG. 2.—Lesions around a nipple. *(A)* Unruptured vesicle. *(B)* Recently ruptured vesicle.

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FIG. 3.—Typical lesions in an uncommon position. On the hairless part shown there are remnants of an expanding area of shedding epithelium.

FIG. 5.—Areas of pigmentation remaining after complete healing of squamae.

CLINICAL COMMUNICATION

TWO CASES OF ECTOPIC LIVER IN THE CAT

BY

R. F. CHRISTIE AND J. N. GRIPPER

ROYAL (DICK) SCHOOL OF VETERINARY STUDIES

CASE I (INTRATHORACIC LIVER)

In the course of routine dissection on a number of cats, one specimen was found which exhibited remarkable features.

The subject was an aged female tabby cat which was brought to the College for destruction because the owner was entering hospital. The cat had no clinical history and apart from a small wound on the right forelimb showed no disability. It was destroyed under anaesthesia and was preserved using formaldehyde solution.

The dissection which followed was routine and no abnormality was observed on exposure of the chest wall other than that some muscles of the chest wall were well developed.

The abdominal cavity was opened, and it was immediately observed that the stomach was distended and, surprisingly, that the liver was absent. Closer examination in this cavity revealed that the duodenum and part of the omental folds entered the thorax by a greatly enlarged caval hiatus.

The thoracic wall and sternum were then removed and a fully developed liver with five lobes, a large portion of the greater omentum, and a portion of duodenum with pancreas attached were found in the thoracic cavity.

The diaphragm was then examined for evidence of traumatic damage but no blood coagula, rupture, or scar tissue was detected. The dorsal and ventral attachments of the diaphragm were intact—the latter having to be separated from the costal arch and sternum with a scalpel.

The liver weighed 5½ oz. and was markedly congested. It was covered with peritoneum and its shape conformed with that of the thoracic cavity. The dorsal surface presented a well-defined cardiac impression, caudal to which was a deep fissure for the caudal vena cava.

The ventral surface conformed closely with the shape of the chest floor, while the free border was anterior and extended as far forward as the first rib. The attached border was dorsal and caudal, being related to the mediastinal surface of the diaphragm.

The right central lobe contained a fissure in which the gall bladder was lodged. The omental process was enclosed in a lesser omentum.

The heart was normal in size, but owing to the encroachment of the liver it had been displaced to the left.

The lungs had normal lobation but were very much reduced in size ; this was particularly so in the case of the right lung which was confined to the dorsal third of the thoracic cavity, the cardiac and intermediate lobes being especially smaller. The lungs, having been fixed *in situ*, were not collapsed.

In the abdominal cavity the stomach was situated on the left side, the anterior surface and the greater curvature being related solely to the diaphragm. The first loop of the duodenum with the head of the pancreas attached was situated in the thorax together with part of the greater omentum.

The remaining viscera appeared normal but the tension of the greater omentum had displaced the contracted spleen from its normal position in the left side of the abdomen and it was lying transversely on the abdominal floor ; a renal impression was on the dorsal surface of the isthmus of this organ.

The presence of a well-developed mammary ridge and rich blood supply to the uterus suggested that the cat may recently have had kittens in spite of the gross anatomical anomalies.

Histological examination of paraffin wax sections stained haematoxylin and eosin shows a moderate degree of venous congestion in all lobules. The presence of haemosiderin in Kupffer cells and of several focal areas of telangiectasis suggests that this congestion has existed for some time. Slight interference with cardiac action, hepatic venous supply or hepatic venous drainage such as might be produced by the abnormal position of the liver could result in the changes described above.

CASE II (INTRAPERICARDIAL LIVER)

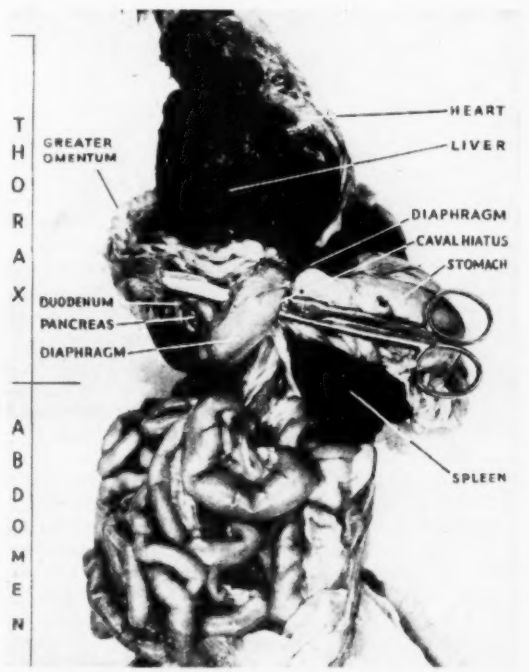
A few days after the discovery of the case just described another fourth year student in the course of routine dissection came across a black, adult male cat exhibiting an abnormal liver.

On examination it was found that a portion of its central lobe was present within the pericardium, where it was enveloping the caudal two-thirds of the heart. There was no evidence of haemorrhage in abdominal or thoracic cavities. The tendinous portion of the diaphragm was not fully formed, and this specimen was almost identical with the case described by Speed (1949).

In Case II slight abnormalities similar to those described in Case I were present in histological sections prepared from the intrapericardial liver lobe.

DISCUSSION

Recent traumatic rupture of the muscular portion of the diaphragm would result in haemorrhage. If such damage was of longer standing scar tissue would have been visible. Recent rupture of the tendinous portion of the diaphragm would also have led to haemorrhage though probably smaller in amount. Scar tissue from a healed rupture of the tendinous portion of the diaphragm would be less easily detected, however, since it would differ little from the surrounding relatively



acellular connective tissue. The possibility of these two cases being due to long-standing rupture of the tendinous portion of the diaphragm cannot therefore be definitely eliminated.

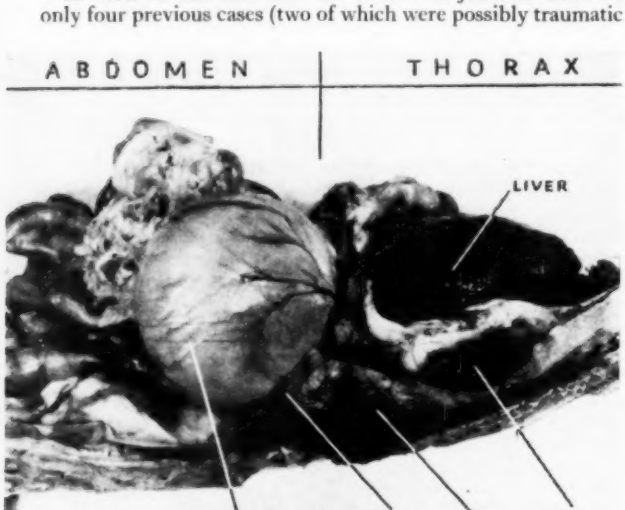
In its normal development the diaphragm takes origin from three sites ; the septum transversum ventrally and the two pleura-peritoneal folds dorsally. The latter grow downwards and inwards to fuse with the former which grows upwards. This fusion forms the tendinous portion of the diaphragm, it is complete and there is no feature to indicate its demarcation.

In our opinion, if the liver were premature in development it is possible that the liver tissue growing forward would cause the diaphragm to complete its formation in a position caudal to the ectopic liver.

In Case II the intrathoracic portion was confined to the central lobe and this was not sufficient to redirect the growth of the diaphragm although it prevented the completion of the tendinous portion of the diaphragm.

If the diaphragm developed abnormally the edges would be smooth and thus no scar tissue would be present ; however the diaphragm grew it allowed a pressure in the chest compatible with the normal functioning of the lungs.

In view of the fact that the American journals describe only four previous cases (two of which were possibly traumatic



in origin) (Reed, 1951) and the British journals only have one case on record (Speed, 1949) the finding of two cases in the dissection of only 20 cats is a remarkable coincidence.

From a total of 427 cats of all breeds, all sexes, and all ages submitted for autopsy to the Department of Veterinary Pathology between August 1st, 1948, and July 31st, 1952, only six showed diaphragmatic hernia. Four of these cases showed widespread traumatic damage, including herniation of the liver through the ruptured diaphragm, and in each case there was marked internal haemorrhage. These cats had been in good health until they were found dead or dying within two hours of a road accident. The other two cases showed no evidence of recent traumatic injury or haemorrhage. One of these died under pentothal anaesthesia and at autopsy showed an enlarged caval hiatus through which the whole of the small intestine, caecum, three lobes of the liver and the base of the spleen projected into the thoracic cavity. The other case occurred in a one-month-old kitten which was destroyed because it had been unwell for three weeks and at autopsy part of the liver and small intestine was found intrathoracically. This case especially supports our theory of the congenital origin of the condition.

Acknowledgments.—Acknowledgments are made to Professor T. Grahame, T.D., F.R.C.V.S., F.R.S.E., and Mr. J. G. Speed, M.R.C.V.S., for their assistance in the preparation of this article, Mr. K. W. Head, B.Sc., M.R.C.V.S., for his pathological report, Mr. P. G. D. Morris, M.A., M.R.C.V.S., and Mr. E. Roberts for the histological sections, Mr. R. S. Hood for the photographs and Mr. D. F. Jones for the second specimen.

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ABSTRACTS

Heterosis in Livestock*

Hybrid vigour is now mainly a livestock farmer's term, and usually means that a cross-bred is a better animal in some way than its parents. Heterosis can be defined as a positive or negative deviation of any character from an expected value. If it is assumed that the performances of the progeny of a given type of mating will fall midway between those of the parents, then that is the expected result. Performances significantly in excess of this proclaim positive heterosis, and those below negative heterosis. The idea of hybrid vigour does not embrace negative heterosis.

Geneticists do not regard heterosis as a special property of cross-breds or hybrids, and much research is being carried out to study its nature, and on how to make the fullest use of it. Inbreeding reduces the number of gene pairs which are heterozygous, and the resulting loss of vigour can readily be interpreted as a gradual extinction of heterosis. It is significant that, with all types of livestock, the traits that inbreeding depresses most strikingly are viability and fertility, and that these same traits recover markedly with the re-establishment, by crossing, of heterozygosity. The inference is that they depend on a degree of heterosis for their normal expression in outbred animals, and they will respond to higher degrees of heterozygosity where these can be obtained by crossing. Evidence from the study of inbred lines of pigs and poultry supports this inference.

Heterosis can be utilised in practice by making inbred lines and picking out those which give good results when crossed —results so good that the vigour lost on inbreeding is not only regained but enhanced ; or by breeding specifically for crossing merit, particularly in those breeds which specialise in producing males for crossing ; or by cyclical crossing. The idea behind this last method is to secure and maintain heterosis in a self-contained system. Males of three or more breeds or lines of the same general productive purpose are used in a regular cycle on the females, the daughters of the male of the first type being mated to a male of the second type, and so on. By the time a male of the first type used is again employed the genetic residue of the previous one will be small. This method does not produce even-looking stock, but is easier to establish than the other two. All three methods will stand or fall by their economic merits in comparison with pure-breeding.

J. O. L. K.

* **Heterosis in Livestock.** Donald, H. P. (1953). N.A.A.S. Quarterly Review (Autumn). H.M.S.O. 8–13.

Sterility and Sperm Examination in Stallions*

The object of this investigation was to establish breeding standards for the Flemish stallions used in the province of Zeeland. From 1948 to 1952 data were collected from 35 stallions and from 3,000 mares covered by them and comprised mating dates, clinical observations on the external and internal male genital organs, service behaviour with the artificial vagina and a laboratory examination of 72 ejaculates.

Half of the mares were mated once and of these 70 per cent. conceived. In the remaining half 26 per cent. were covered twice and 67 per cent. of them became pregnant, 18 per cent. mated three times gave 45 per cent. conception and of the other 6 per cent. of mares which were served four or more times 34 per cent. became pregnant. Fertility was better in May and June than in March and April.

Among the clinical reproductive abnormalities in the stallions were under-developed testicles in three-year-olds, testicular atrophy and fibrosis in old stallions with or without fibrosis of the epididymis—the former being associated with low fertility. There was one case of unilateral orchitis with concomitant atrophy of its fellow and resultant poor quality semen during the next six months, after which the non-inflamed testicle restored the animal's fertility. Coital exanthema, although frequent, was not serious from the fertility aspect.

For semen collection the English model A.V. was modified by incorporating an additional tap which acted as a safety valve during introduction of the penis. Seventy-two out of 80 attempts at semen collection succeeded. Refractory stallions were rested a few days and subsequently nearly always ejaculated. Occasional older horses repeatedly ejaculated only accessory secretions and the authors believed that the same thing happened when they served naturally and might have been due to overuse.

The semen qualities found in good stallions were not less than 10,000 sperms per $mm.^3$, 70 per cent. motility and 65 per cent. morphologically normal sperms.

G. H. A.

* **Sterility and Sperm Examination in Stallions.** Wagenaar, G., & Grootenuis, G. (1953). *Int. Vet. Cong., Stockholm, Proc. Part I.* **2.** 726–730.

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Serving Behaviour in Dairy Bulls*

Six pairs of identical bull twins were used to determine the influence of heredity and rearing intensity on service behaviour. Up to the age of 18 months three different diets —high plane, normal and low plane—were used and the members of each pair of twins were placed in different dietary groups. Thereafter all the bulls were fed the same normal diet and each week semen collections and notes on service behaviour were made and continued on each pair for periods of up to seven years.

Among the 12 bulls there were considerable variations in service behaviour ranging from normal service with ejaculation down to complete refusal to serve. Despite the difference in rearing intensity the members of each pair showed a strong similarity in serving ability—whether it was normal or abnormal—thus indicating the prior importance of heredity over environment in determining this aspect of behaviour.

G. H. A.

* **Experimental Studies on Serving Behaviour in Dairy Bulls.** Bane, A. (1953). *Int. Vet. Cong., Stockholm, Proc. Part I.* **2.** 709–712.

REPORT

[Annual Report for 1952 of the Department of Veterinary Services and Animal Industry, Nyasaland.]

In this report emphasis is laid by the Director of Veterinary Services (Mr. D. E. Faulkner, B.V.Sc., D.V.M., F.R.C.V.S.) on the social and economic importance to Nyasaland of a fully expanded and productive livestock industry, and the part to be played by the Department towards this end. The need for the close integration of livestock in agricultural development is fully realised. The Department must therefore concern itself not only with the control and prevention of disease, but in co-operation with the Department of Agriculture with everything that will encourage the adoption of better methods of husbandry.

Staff difficulties have in the past greatly hampered the work of the Department, but with the adoption by the Nyasaland Government of the Director's "Policies and Plans for the Development of the Livestock Industry" there is good reason to hope that staff posts which have been held in abeyance from lack of funds will now be filled. A pleasing development in this direction is the appointment of a Veterinary Research Officer.

This officer, during the remainder of the year since his appointment, has busied himself with the organisation of laboratory facilities and with essential diagnostic and routine work.

Diseases

Of the diseases prevalent in the country those conveyed by ticks have been of greatest economic importance. Heartwater and redwater, especially the former, have shown a high incidence.

There is evidence, too, that the incidence and distribution of some species of ticks have changed since the last survey 10 years ago. For example, *Rhipicephalus simus*, not previously considered a cattle tick, has been found in heavy numbers in cattle in the Southern Province. And again, *Rhipicephalus evertsi*, not previously known to occur in Nyasaland, has been found in the Blantyre area. East Coast fever caused a number of deaths in the Central and Northern Provinces.

To implement a scheme for the control of ticks, and partly at least as a substitute for dipping tanks, which are now costly to build, a spray tunnel was purchased and is being tested.

Trypanosomiasis is another disease which is on the increase. During the year some 1,600 animals received treatment with dimidium bromide. The majority of cases occurred in the Lower River and were of a mild nature.

Mechanical transmission by species of Tabanidae is thought to play a considerable part in the spread of the disease.

Antrycide pro-salt continues to give good results in protecting cattle against infection while journeying through tsetse belts to markets for slaughter. Blackquarter is kept under control in known infected areas by the annual vaccination of young stock.

Two cases of tuberculosis were discovered in slaughter stock, and one outbreak of swine fever occurred. No case of African horse sickness was reported but the vaccination of all horses is continued.

Rabies continues to cause concern. In one outbreak nine cows on one farm developed the disease after having been bitten by a rabid dog. In another instance where six dairy cows were bitten by a rabid donkey none developed the disease. (This latter supports the contention that superficial abrasions are not a ready means of entry for the virus.)

Fleury avianised virus vaccine has been used during the year on 512 dogs and no case of the disease has developed among them.

Demodectic mange in cattle is sufficiently serious to warrant mention in the report.

Streptothricosis, sometimes known as cutaneous actinomycosis (Senkobo disease in Nyasaland) was also diagnosed. The application of lime and sulphur washes was proved to be the best treatment. [*Arsenite of soda cattle dip is also an effective treatment.—Abstractor.*]

DEFICIENCY DISEASE

For some time there has been observed in some areas a condition in cattle associated with progressive emaciation and skin lesions. The Veterinary Research Officer, in investigating this condition, found in all cases a fall in inorganic serum phosphorus and concludes that hypophosphorosis is the cause, although it would appear that other factors are associated.

ANIMAL HUSBANDRY

In this sphere of departmental activities steps have been taken to reduce the heavy mortality among calves in the wet season, by the provision of separate covered calf shelters. The making of grass silage is also being encouraged for dry season feeding. A sheep breeding experiment was started on the plateau of the Zomba mountains but heartwater and internal parasitism took their toll of young lambs, and the lack of sufficient grazing during the dry season was another setback.

Three centres for livestock improvement and animal industries were continued. At these centres local cattle are being selectively bred for milk, meat and draught purposes. A scheme is also in progress for the supply of pedigree stock to European farmers. Young pedigree Jersey calves and other breeds (often a few days old) are flown in to the country and reared by the Department until weaning age, when they are sold. During the time these animals are at the centres they are immunised against tick-borne diseases, including heartwater.

A hide and skin improvement scheme has also been started and drying sheds have been erected. Better methods of slaughtering and flaying are being taught. A tanning and cobbling unit is also in operation. A dairy industry, in which is incorporated pig breeding and rearing, is also being fostered by the Department.

All these activities will give to Mr. Faulkner (who has not long come to Nyasaland), and his staff, an opportunity of demonstrating by practical results the value to the country of a livestock industry fully expanded, with diseases under control and animal products fully and properly exploited.

W. W. H.

REVIEW

[**The Popular Poodle.** By CLARA BOWRING and ALIDA MONRO. (1953). Popular Dogs Publishing Co., Ltd., London. 12s. 6d.]

For those specially interested in poodles, and for many others, this should be an interesting and an informative book. The origin and development of the breed and the different types are well described and illustrated. One chapter deals with showing and breeding of poodles in America. General management, breeding, clipping and showing are all discussed, and advice is given on buying and training puppies. The conditions in which the authors recommend calling in veterinary assistance are sound and show appreciation of early diagnosis. There are two appendices giving a list of champions from 1946 to 1952, and salient points from the French Standard. The book is well produced, and there is a useful index.

IN PARLIAMENT

FOOT-AND-MOUTH DISEASE

DISCUSSION IN THE HOUSE OF LORDS

In the House of Lords on February 24th, the Earl of Iveagh called attention to the continuing outbreaks of foot-and-mouth disease and moved for papers. Describing his experience of foot-and-mouth disease outbreaks on his own estates, Lord Iveagh stressed the importance of pressing forward veterinary research with all possible energy. Viscount Alexander, in supporting these observations, referred to the heavy cost to the Exchequer caused by compensation. Lord Glyn said: "As this is the only country which has remained comparatively free, the export of livestock is of tremendous importance. The slaughter policy, unpleasant as it is, must be carried on." Paying a tribute to the work done at Pirbright, Lord Glyn said: "Dr. Galloway—and anybody who knows about these things realises that he is the greatest expert probably in the world, certainly in this country, on foot-and-mouth disease—has done more than anybody else to contribute towards the investigation of this disease."

Lord Swaythling suggested that motor-cars returning from parts of Europe where the disease was endemic were a possible source of spreading the virus. He thought it would be a simple matter to see that every car on entry was thoroughly disinfected.

In his reply Earl De La Warr said it was necessary for the sake of the export trade that outbreaks of foot-and-mouth disease in this country should not be exaggerated. It was not endemic here. In 1952 the total number of outbreaks was 495, in 1953 it was 40, and this year so far it was 6. Compared with certain European countries he might mention that in 1952 there were 84,500 outbreaks in Western Germany and 320,000 in France. While there was strong evidence for the theory that migratory birds could introduce the infection, evidence did not point to motor-cars as a means of transmitting it.

About £700,000 was being spent on developing Pirbright Research Station and current expense this year would be about £98,000.

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Questions

IMPORTATION OF HORSES FOR SLAUGHTER

Sir Thomas Dugdale, Minister of Agriculture, answering a number of questions in the House of Commons on February 25th, announced that he had asked for a report on the inspection of horses shipped from Ireland, together with details of other arrangements at ports in this country. The Minister said he had no power to control the entry into Britain of horses from Ireland intended for slaughter, and he could hold out no hope that the Government would be able to introduce legislation. He added that the responsibility for enforcing the Horses (Sea Transport) Order and the Transit of Horses Order rested with local authorities and the police. Veterinary Officers of the Ministry exercised general supervision and one Veterinary Officer spent the whole of his time supervising the transport of animals by sea. Sir Thomas Dugdale said he was determined to go much further into this problem of the importation of horses for slaughter.

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"CORBIDOR" FOR PIGEONS AND CROWS

Colonel CLARKE (February 23rd) asked the Minister of Agriculture whether the investigations undertaken by his Department into a French preparation called "Corbidor" for doping crows and pigeons are yet completed, and whether he will make a statement.

Sir T. DUGDALE: No investigations have yet been undertaken by my Department with the French preparation "Corbidor." Its use is at present illegal in this country.

LANDRACE PIGS

Major ANSTRUTHER-GRAY (February 23rd) asked the Secretary of State for Scotland if he will now state the figure to which he proposes to restrict the importation of Landrace pigs; and whether this figure will allow all outstanding applications to be granted, subject to proper veterinary precautions.

Mr. J. STUART: I have arranged with my right hon. Friend the Minister of Agriculture for the importation of 41 Landrace pigs

into Scotland. This will enable all present applicants to receive a quota but will not be sufficient to satisfy all these applications in full.

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PIG BREEDING

Mr. PHILIPS PRICE (February 25th) asked the Minister of Agriculture what steps are being taken to improve the type of pig in this country by a system of recording progeny and food converting capacity similar to the practice to-day in Denmark.

Sir T. DUGDALE: The progeny testing of boars with a view to the improvement of breeding stock is already being conducted on a small scale by the National Pig Breeders' Association at Selby in Yorkshire. Proposals are under consideration for extending the work on lines similar to Danish practice.

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WARBLE FLY

Mr. G. WILLIAMS (February 25th) asked the Minister of Agriculture if, in view of the widespread disregard of the Warble Fly (Dressing of Cattle) Order, 1948, he will give immediate publicity to this Order and also take steps to see that it is enforced.

Mr. HURD asked the Minister of Agriculture what further steps he proposes to take this year to get fuller co-operation in observing the Warble Fly Order so that real progress may be made in getting rid of this pest which causes loss to farmers and the leather trade.

Sir T. DUGDALE: Local authorities are responsible for the enforcement of the Order. In co-operation with them, I propose to arrange an intensive publicity, advisory and educational campaign in the coming months, designed to bring home to owners of cattle their obligations under the Order.

Mr. WILLIAMS: While thanking the Minister very much for that satisfactory reply, may I ask if he is aware that it is little use for one man to dress his cattle against warble fly if none of his neighbours do the same? In many cases farmers dress the cattle which are at the farm and the milking stock and younger stock are nearly always neglected. In some cases it has been done once and not continued over 30 days. Will my right hon. Friend consider taking more snap checks to see that the law is enforced?

Sir T. DUGDALE: It is for those reasons that I have intensified the campaign. They are only some of the reasons which bring out the necessity for the Order.

Mr. HURD: Will my right hon. Friend pay particular attention to cattle coming in at the ports from Ireland, and also cattle at the markets, because in that way he will impress the purposes of the Order most effectively?

Sir T. DUGDALE: I will certainly take note of that.

Mr. G. WILLIAMS asked the Minister of Agriculture for an estimate of the annual loss caused by warble flies to the production of meat and milk in this country.

Sir T. DUGDALE: I regret that I have no information on which to base a reliable estimate.

Mr. WILLIAMS: Is my right hon. Friend aware that a very large sum of money is lost every year? Will he consider the use of a dyed derris powder for dressing cattle so that the inspector who goes along can see at once which have been dressed and which have not?

Sir T. DUGDALE: It is a very complicated problem. One can assess the loss of hides. This has definitely gone down, it being £527,000 in 1951 and £305,000 in 1953. It is impossible to assess the loss of meat or milk.

VETERINARY MANPOWER

In an endeavour to obtain a general picture of the position, members are asked to notify the General Secretary, B.V.A., at 7, Mansfield Street, Portland Place, London, W.1, if they are having difficulty in obtaining veterinary assistants. A brief and confidential questionnaire has been prepared which members may obtain, on application, from B.V.A. headquarters to help them to supply particulars specially required by the Association.

In addition to this means of obtaining information, a circular is again being sent to Divisions seeking help on the same lines.

The co-operation of members in this matter would be much appreciated.

NOTES AND NEWS

Diary of Events

Mar. 10th.—Meeting of the Editorial Committee, B.V.A., at 7, Mansfield Street, W.1, 2.30 p.m.

Mar. 17th.—Laboratory Meeting of the Royal Society of Medicine, Section of Comparative Medicine at the Royal Veterinary College, N.W.1, 4.30 p.m.

Mar. 17th.—Ordinary Meeting of the Microscopical Society at Tavistock House South, Tavistock Square, W.C.1, 5.30 p.m.

Mar. 18th.—Annual Dinner and Dance of the East Midlands Division, B.V.A., at the George Hotel, Nottingham, 7.15 p.m.

Mar. 18th.—Meeting of the Ayrshire Division, B.V.A., at the Hotel Dalblair, Ayr, 2.30 p.m.

Mar. 20th.—Annual General Meeting of the Biochemical Society in the Department of Chemistry, University College, Gower Street, London, W.C.1, 10.45 a.m.

Mar. 25th.—V.V.B.F. Ladies' Guild: North of Scotland Division, B.V.A., Annual Dance, Aberdeen.

Mar. 25th.—Annual General Meeting of the Western Counties Division, B.V.A., at the Imperial Hotel, Exeter, 11 a.m.

Mar. 26th.—Annual Dinner and Dance of the Yorkshire Division, B.V.A., at the Parkway Rooms, South side entrance to the Parkway Hotel, Bramhope, Leeds, 7 p.m.

Mar. 31st.—Meeting of the Technical Development Sub-committee on the Calf Report, 7, Mansfield Street, W.1, 11 a.m.

Apr. 1st.—Meeting of the Technical Development Committee, B.V.A., at 7, Mansfield Street, W.1, 10.30 a.m.

Apr. 2nd.—Joint Ordinary General Meeting of the A.V.T. and R.W. at the Royal Veterinary College, Camden Town, N.W.1, 10 a.m.

Apr. 3rd.—Annual Dinner of the B.R.X. Club at the Royal Veterinary College, Camden Town, N.W.1, 6 p.m.

Apr. 10th.—Reunion Dinner of the R.V.C. '52 Club at "Ye Miller of Mansfield," Streatley, 7.30 p.m.

Sept. 19th—25th.—72nd Annual General Meeting and Congress of the British Veterinary Association at Torquay.

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B.V.A. Council and Committee Meetings at the University of Glasgow

Monday, April 12th

10.30 a.m. Veterinary State Medicine Committee.
2.15 p.m. Home Appointments Committee.
3.30 p.m. Parliamentary and Public Relations Committee.

Tuesday, April 13th

10.30 a.m. Organising Committee.
1.45 p.m. General Purposes and Finance Committee.

Wednesday, April 14th

10.0 a.m. Council Meeting.

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PERSONAL

Births.—BLANSHARD.—On February 25th, 1954, at Merthyr Guest Hospital, Templecombe, to Brenda (*née* Hughes), wife of W. Blanshard, B.SC., M.R.C.V.S., a son (Michael Thomas William)—a brother for Caroline and Priscilla.

MACLEOD.—On February 5th, 1954, to Gwen (*née* Evans), wife of Donald MacLeod, M.R.C.V.S., of The Gables, Kington, Herefordshire—a brother for Ian.

OGDEN.—On February 20th, 1954, in North Wales, to Jill, wife of Laurence Ogden, of Aston Tirrold, Berkshire, a son.

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Marriages.—CHANDLER—SCHNEIDER.—The wedding took place on February 14th, 1954, at the Church of St. Thomas More, Eastcote, Middlesex, between Richard L. Chandler, PH.D., B.SC., M.R.C.V.S., only son of Mrs. D. N. Chandler and the late Mr. John Chandler, of Portsmouth, and Angela M. Eugenie Schneider,

the younger daughter of the late Mr. and Mrs. Xavier Schneider, of Strasbourg.

Ferguson—Roberts.—On February 26th, 1954, at Devonshire Street Congregational Church, Keighley, Yorks, Murdo Ferguson, M.R.C.V.S., 16, Devonshire Street, Keighley, youngest son of Mrs. Ferguson and the late Mr. Ferguson, Skeatboatbridge, Isle of Skye, to Irene, only daughter of Mr. and Mrs. H. Lister, of 51, Redcliffe Street, Keighley.

Sommerville—Rushforth.—At St. Andrew's Church, Penrith, on March 1st, 1954, John Sommerville, M.R.C.V.S., only son of Mr. George Sommerville and the late Mrs. Sommerville, 337, Cumbernauld Road, Glasgow, to Norma Elizabeth Rushforth, only daughter of Mr. and Mrs. Gordon Rushforth, 10, Carleton Road, Penrith.

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Appointments.—Mr. E. A. Gray, M.Sc. (Cantab.), M.R.C.V.S., has joined the staff of the Bayer Biological Institute laboratories at Exning, Nr. Newmarket, as their Chief Bacteriologist.

Ministry of Agriculture, Veterinary Field Staff.—Mr. R. Moss, B.V.Sc., M.R.C.V.S., has been appointed to the permanent staff as a Veterinary Officer and is stationed at Beverley.

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R.C.V.S. OBITUARY

Cochrane-Dyet, John, M.C., M.R.C.V.S., of Llandevaud Court, Nr. Newport, Mon. Graduated London, July 10th, 1925. Died February 20th, 1954; aged 60 years.

Wood, Edward Francis, M.R.C.V.S., 11, Kingsmead, Upton Heath, Chester. Graduated London, May 17th, 1895. Died February 20th, 1954; aged 82 years.

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POST-GRADUATE SCHOLARSHIPS

During the next three years Agricultural Departments of the United Kingdom are to spend £625,000 of counterpart funds derived from United States economic aid on projects designed to increase agricultural productivity. The £25,000 for post-graduate scholarships will be allocated as follows:—

England and Wales	£15,000
Scotland	£5,000
N. Ireland	£5,000

The Ministry of Agriculture and Fisheries propose to make £15,000 of the counterpart funds from United States economic aid available for the provision of post-graduate scholarships in the following subjects:—

(*a*) Agricultural Economics.
(*b*) Farm Management.
(*c*) Estate Management.
(*d*) Land Economics and Land Use.

The value of these scholarships will be between £400 and £800 per annum plus all compulsory fees, authorised travelling expenses and a book allowance not exceeding £10 per annum. The scholarships are free of income tax.

Candidates must be British subjects resident in the United Kingdom.

The qualifications required will be considerably higher than for ordinary post-graduate scholarships. Further information and application forms may be obtained from the Secretary, Ministry of Agriculture and Fisheries, 1/4, Cambridge Terrace, Regent's Park, London, N.W.1.

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The Ministry of Agriculture and Fisheries and the Department of Agriculture for Scotland propose to award, for the academic year beginning October 1st, 1954, a limited number of post-graduate scholarships in agricultural economics, husbandry, statistics and agricultural and dairy engineering.

The closing date for applications is March 15th, 1954.

Further particulars can be obtained from the Secretary, Ministry of Agriculture and Fisheries, as above, or the Secretary, Department of Agriculture for Scotland, St. Andrew's House, Edinburgh, 1.

Applicants resident in Northern Ireland should apply to the Ministry of Agriculture and Fisheries at the above address.

PRESS CONFERENCE ON FOWL PEST

A Press conference on fowl pest was held at the Ministry of Agriculture recently. Mr. G. R. H. Nugent, M.P., Parliamentary Secretary to the Ministry, was in the chair, and was supported by Mr. J. N. Ritchie, Chief Veterinary Officer. Mr. Nugent told the conference that last year there were 978 outbreaks, involving slaughter of nearly 600,000 birds and leading to the payment of compensation of about £500,000. This year the situation had not improved, and so far there had been 287 outbreaks. The Ministry was most concerned with outbreaks of the subacute form of the disease. Being less obvious to the eye of the poultry-keeper it was quite often not reported until too late, or not reported at all. These circumstances meant that the disease could spread at a faster rate than the Ministry's Veterinary Officers could be informed of it. As previously described in the *Record*, Mr. Nugent mentioned that a "clean area" consisting of Wales and the West Midland Counties had been established, and it was hoped gradually to extend this area into other parts of the country.

In reply to a question he said that among areas tending to be more heavily infected were Lancashire, Lincolnshire, the Eastern Counties and some Home Counties. Scotland suffered far less from fowl pest than did England because of regulations which had for some time been enforced against the movement of poultry into the country.

Mr. Ritchie told the meeting that only one case had been proved when fowl pest had been communicated to a human being, causing eye trouble. The case had occurred on his own staff.

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THE MANAGEMENT AND HOUSING OF PIGS

There is a growing interest in the housing of pigs which is now recognised to be one of the more important of the factors which influence their well-being. The various systems of housing which are in use at present are remarkable for their great diversity, but until recent years little work had been done on such fundamental points as the optimum temperature at which to keep pigs, the insulating properties of various types of building construction and the most suitable form of ventilation to employ.

More recently the need to provide the pig with a warm, dry bed and some form of separate yard or dunging passage has been appreciated. Among the systems which have been designed to incorporate these features is one evolved at the Harper Adams Agricultural College by Mr. W. T. Price, Principal of the College and Director of the Pig Husbandry Experimental Station, who spoke at Bedford on February 17th on the management and housing of pigs. The meeting was one of a series organised by the Bedfordshire A.E.C.

The speaker described the system of housing used at the Harper Adams College, introducing this subject by saying that the pig should be given what he wants: warmth, comfort and cleanliness. He advocated that breeding stock should be kept out of doors whenever possible. Dry sows and in-pig gilts could be kept in very simple houses such as old ammunition shelters, but these should contain plenty of straw.

For farrowing sows the Harper Adams "Natural Pig Farrowing Unit" is used. This consists of a low wooden hut (maximum height 4 feet) with a sloping roof and back which are lined with fibreglass. The piglets have a creep under a rack of hay. This creep can be reached from the outside through a small sliding window. The roof can be lifted 6 inches to provide extra ventilation in the summer.

Mr. Price next described the "Harper Adams Pig Parlour." This is used both for fattening pigs and, in winter months, for farrowing sows. It consists of a low, well-insulated house with outside yards, and is built as a single range with the yards facing south so that they serve as "sun parlours." A feeding passage runs the length of the range and, in the summer, acts as a horizontal ventilation shaft. The inside pens are divided by partitions which are taken up to the ceiling. The floor of the inside pens consists of hollow bricks laid on pitch or bitumen, and it was said that it is unnecessary to use straw.

The talk was illustrated by a large number of lantern slides, many of which were in colour. The audience showed their appreciation by asking numerous questions on the many interesting points of pig husbandry which had arisen. Readers interested in these methods of housing pigs will find them described and

illustrated in a booklet "The Housing of the Pig," written by Mr. Price and published by the Harper Adams Agricultural College, price 2s. E. A. G.

ADDRESSES OF DISEASE-INFECTED PREMISES

The list given below indicates, first, the county in which are situated the premises on which disease has been confirmed, followed by the postal address and date of outbreak.

ANTHRAX:

Lanark.—Somfallow Farm, Wiston, Lanington (Feb. 22).

Lancs.—Parkside Farm, Off Chaderton Park Road, Chaderton, Oldham (Feb. 22).

Oxford.—The Park, Little Faringdon, Lechdale (Feb. 23); Greys Court Farm, Henley (Feb. 26).

FOOT-AND-MOUTH DISEASE:

Derbys.—Aston Farm (North), Sudbury (Feb. 24).

Staffs.—Top House Farm, Dodsleigh, Stoke-on-Trent (Feb. 22); Littlewood Farm, Hollington, Stoke-on-Trent (Feb. 24).

FOWL PEST:

Beds.—Blunham House Farm, Blunham, Bedford (Feb. 24).

Bucks.—Elsinore Poultry Farm, Deanfields, Sanderton, High Wycombe (Feb. 26).

Cambs.—Orchard House, Pound Lane, Isleham, Ely (Feb. 22); The Bungalow, The Pits, Isleham (Feb. 27).

Devon.—Rookery Nook, Nossmayo, Plymouth (Feb. 24).

Lancs.—Foxcroft, Gill Lane, Longton, Preston; Barkers Farm, Much Hoole, Preston; 33, Woodland Avenue, Thornton, Blackpool; Holmes Farm, Brindle, Chorley (Feb. 23); Lunds Lane Farm, Critchley Farm, and Ristar Villa, Smithy Lane, Much Hoole, Preston; Brooklyn, Gill Lane, Longton, Preston; Goose Green Farm, Moss House Lane, Much Hoole, Preston (Feb. 24); Bond Villa, North Road, Bretherton, Preston (Feb. 25); Cripplegate Farm, Hoghton, Preston; Northern Avenue, Much Hoole, Preston; 6, Fairview Avenue, St. Annes (Feb. 26); Royd House Farm, Laneshaw Bridge, Colne; Ribblesdale Café and Lane End Farm, Little Hoole, Preston (Feb. 27); 3, Edge End Terrace and 4, Stanworth Terrace, Abbey Village, Chorley (Feb. 28).

Lincs.—"Neldar," Park Lane, Gosberton, Spalding (Feb. 27).

Norfolk.—Mayfield Farm; Gesthorpe, Attleborough, Norwich (Feb. 23); Smithfield House, Lenwade, Norwich (Feb. 24).

Rutland.—Ridlington, Uppingham (Feb. 25).

Surrey.—Cottage Farm, Thorpe, Chertsey (Feb. 26).

Suffolk.—Home Farm, and Little London Farm, Wetherden, Stowmarket (Feb. 22); Kiln Farm, Mellis Road, Framsden, Stowmarket (Feb. 24); Tollgate Farm, Bury St. Edmunds (Feb. 26).

Worcs.—Holt Castle, Holt Heath, Worcester (Feb. 25).

Yorks.—90, Mill House Allotments, Anchor Road, Mill House, Sheffield (Feb. 27).

SWINE FEVER:

Beds.—Priory Farm, Turvey (Feb. 26).

Cambs.—Avenue Farm, Elsworth; Chalk Farm, Isleham, Ely (Feb. 22); 28, Telegraph Street, Cottenham (Feb. 26); Bank Farm, Tremlow, Holmes Chapel, Crewe; Manor Farm, Hetherton, Nantwich (Feb. 27).

Ches.—Weaver Park Farm, Darnhall, Winsford (Feb. 22); Millington Hall, Millington, Altrincham (Feb. 26).

Derbys.—Quarry Field Allotments, Stanningley Road, Bramley, Leeds (Feb. 24).

Essex.—76, Lodge Lane, Collier Row, Romford (Feb. 22).

Fife.—Bandrumbeath, Saline, Dunfermline (Feb. 26).

Hants.—Old Park Farm, Kingsley, Bordon (Feb. 22).

Herts.—Edgwarebury House Farm, Elstree, Boreham Wood; Elm Farm, Hare Street, Buntingford (Feb. 23).

Hunts.—Dawson's Yard, Newton Road, Ramsey (Feb. 22); High Holborn Farm, Great Raveley, Ramsey (Feb. 23).

Lancs.—King Street Piggeries, King Street, Ardwick, Manchester (Feb. 26).

Leics.—"The Wayside," Covert Lane, Scraptoft, Thurnby (Feb. 24); Melton Road Allotments, Ashfordby Hill, Ashfordby, Melton Mowbray; Railway Allotments, Marlow Road, Leicester (Feb. 26).

Norfolk.—Myrtle Farm, Potter Heigham, Gt. Yarmouth (Feb. 24).

Middx.—The Croft, Hithermoor Road, Stanwell Moor, Staines (Feb. 26).

Notts.—Watchwood Farm, Oxton Lane, Calverton (Feb. 22).

Salop.—Stanlow Farm, Kingslow, Pattingham, Bridgnorth (Feb. 23); Meadow Brook and Clifton Villa, Ford, Shrewsbury (Feb. 25).

Staffs.—Lower Farm, Dunstable, Burton-on-Trent (Feb. 25).

Suffolk.—Grange Road, Oulton Broad, Oulton, Lowestoft (Feb. 24).

Surrey.—Sunny Brook Farm, Ash Green, Ash, Aldershot (Feb. 22).

Sussex.—Broomers Hill Farm, Mareshill, Pulborough (Feb. 24).

Yorks.—Cooke Street, Bentley, Doncaster (Feb. 24); 201, Horby Road, Wakefield (Feb. 26).

CORRESPONDENCE

The views expressed in letters addressed to the Editor represent the personal opinions of the writer only and their publication does not imply endorsement by the B.V.A.

FODDER-BEET POISONING IN CATTLE

Sir,—Two interesting articles published in last week's issue of *The Veterinary Record* deal with symptoms, including hypocalcaemia, occurring in cows following the ingestion of fodder-beet; both have certain features in common and both relate to Guernsey females.

Veterinary surgeons practising in Cornwall, where Guernseys form the staple breed, are familiar with similar cases which occur with great regularity among animals, singly or in herds, which have accidentally gained access to piles of turnip-tops, beet-tops, lawn grass mowings, or sometimes to the excess leaves lopped off from the locally grown broccoli plants during packing. Fodder-beet is only one of the root or other crops which may be involved. The writer has seen both magnesium and calcium imbalance kill as many as seven cows in a herd on more than one occasion, shortly after they had broken into fields of new, rapidly growing leys.

The object in drawing attention to the particular breed mentioned in both reports is because the writer has so far failed to encounter similar cases among the Shorthorns, Friesians or Ayrshires of the Midlands. Is it significant that these breeds possess a lower butter-fat milk content?

Similar cases did not appear to crop up in Cornwall in male animals, apart from ordinary bloat, in spite of the fact that the farmers never hesitated to throw piles of partly dried turnip-tops and other green fodder into the fields which harboured the South Devon beef steers. Is it possible that endocrine dysfunction may result from the absorption of oestrogen-like substances which may be present in rapidly grown green fodder, and that females of a breed possessing a delicate endocrine balance and a large butter-fat output may be more easily upset than the Danish cows which appear to eat fodder-beet with impunity?

Cases in Cornwall were frequently treated quite successfully by means of intravenous calcium, but not all the cases responded. A modified rumenotomy was often necessary, particularly when frothy bloat accompanied the condition. A 4-inch incision was made into the rumen, which was anchored to the skin at four or more points. The animal was then turned over and supported on wads of straw so that the orifice lay in a dependent position and fluids and gases could escape. In most cases no attempt was made to remove solids. The wound was closed in the usual manner after 48 hours. It is interesting to note that Muir ("Text Book of Pathology"), referring to tetany in humans, states: "It is met with also during pregnancy and lactation, and there is a well-recognised variety which occurs in dilatation of the stomach with fermentative changes in its contents."

Is it possible that the absorption of excessive amounts of oestrogen-like bodies from the fodder may give rise to parathyroid imbalance in just the same way as seems to be the case in those instances of hypocalcaemia (false milk fever) which occur so very commonly in non-pregnant Guernsey cows following oestrus?

It will be interesting if practitioners who deal with cattle, other than Guernseys, will record their experiences of this condition

and state whether it is seen also in male animals or in steers.—Yours faithfully, R. H. Smythe, 6, Peveril Drive, The Park, Nottingham. *February 27th*, 1954.

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THE R.A.V.C. AND MEAT INSPECTION

Sir,—I have read with much interest the account in the January 9th, 1954, issue of *The Veterinary Record* of the activities of the Royal Army Veterinary Corps in many parts of the world, activities which reflect great credit—and rightly so—on the versatility of the Corps.

I wish, however, to correct the impression given by the article that the R.A.V.C. was responsible for the importation and storage "on the hoof" in Malaya of some 15,000 head of cattle from the Netherlands East Indies just before the outbreak of the Japanese war as a meat reserve in the event of a blockade of Malaya. This was not done by the R.A.V.C. but by the civil Government Veterinary Departments under the direction of the then Director of Veterinary Research and Veterinary Adviser, the late Dr. S. H. Whitworth, to whom the credit should go. It was a mammoth task, undertaken at very short notice by a small but determined staff, and under the most trying and, at times, dangerous conditions. A good account of this period was given in "A Further Appreciation of the Late Dr. S. H. Whitworth, with a Sketch of a Certain Period in the Veterinary History of Malaya" (*Vet. Rec.* **62,** 22. June 3rd, 1950) by a Veterinary Department officer (Mr. R. S. T. Bowden), who, like the rest of us in the Department then, was engaged in carrying out the project. To the best of my recollection there was only one R.A.V.C. officer in Malaya at the time. He, along with most of us, was taken prisoner and, in true R.A.V.C. manner, proved a tower of strength and cheer with his powers of entertainment during the following three and a half years' internment.

On the liberation of Malaya in August, 1945, R.A.V.C. officers, under the British Military Administration, took over the reorganisation and running of the country's veterinary services—which had been kept going in a most commendable manner by the Department's Asian veterinary staff throughout the arduous period of the Japanese occupation—until it became possible to revert to the civil administration on the return of those veterinary officers who were fit enough, after their incarceration, to come back. Dr. Whitworth was, unfortunately, not among them. Internment had taken too great a toll of his health and there is little doubt that it was largely responsible for his death at an early age a few years later. On the resumption of the civil Government most of the R.A.V.C. officers left Malaya, but one or two, captured by the attractions and beauties of the country, joined the Department on demobilisation and are with it now. Those who left are still remembered with affection by those with whom they came in contact.—Yours faithfully, W. E. Lancaster, Director of Veterinary Services, Office of the Director of Veterinary Services, Federation of Malaya, Kuala Lumpur. *February 20th*, 1954.

Sir,—I feel I cannot let Brigadier Peatt's very interesting letter on the history of meat inspection by the R.A.V.C. in India, which appeared in your issue of February 13th, 1954, pass without comment, for, if he will excuse my saying so, there are certain statements in his letter that might give the impression to the uninitiated that no meat inspection was performed by veterinary officers in India until "the revolutionary change," which he describes as taking place in 1944.

This, of course, is far from being the case, as can be checked by a perusal of the annual reports of the civil veterinary administration in the different provinces of India. Speaking of Madras, with which province I was mostly concerned in those far-off days, we had arranged by 1912, with the co-operation of the Public Health authorities, for the inspection of meat at many of the district headquarter towns, where civil veterinary hospitals already existed, to be carried out by civil veterinary assistants, and as far as I know the same practice continues throughout the civil administrations of both India and Pakistan to this day.

I hasten to add that it would have been of the greatest assistance to us on the civil side, in our efforts to expand this important part of the duties of a veterinary officer, if some of Brigadier Peatt's predecessors had been able to arrange at an earlier date than 1944 this very important addition to the responsibilities of the R.A.V.C.—Yours faithfully, Frank Ware, Springfield, Highclere, Nr. Newbury, Berks. *February 25th*, 1954.

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SURVIVAL OF DEEP-FROZEN MAMMALIAN SPERMATOZOA

Sir,—I have seen recently the letter from Mr. A. W. Blackshaw and Professor C. W. Emmens, published in your issue of November 28th, 1953. I have no wish to enter into controversy with my old friend and colleague Professor Emmens, but it seems to me that erroneous inferences might well be drawn from this letter by those unfamiliar with the subject, and I would like to reiterate the following facts:—

(1) Professor Emmens's work on the preservation of spermatozoa at low temperatures has been based essentially on the use of glycerol to protect the cells against the otherwise fatal effects of freezing and thawing. This property of glycerol was discovered by Polge, Smith & Parkes early in 1949, and recorded by them later in that year. The extension of the technique to bull spermatozoa, together with the use of slow cooling, was described by Smith & Polge in June, 1950. Both of these papers are referred to by Emmens & Blackshaw in their first publication on the subject in September, 1950.

(2) Smith & Polge reported, in October, 1950, that they had obtained normal living chicks from eggs fertilised by spermatozoa which had been frozen at −79° C. The birth of a normal bull calf following insemination with semen frozen and thawed by the method of Smith & Polge was recorded in January, 1951, by Stewart, who had been asked by us to carry out a breeding experiment. By the end of 1950, therefore, it had been shown that there was nothing inherently incompatible between exposure of spermatozoa to very low temperatures and the retention of their power to fertilise the egg and give rise to normal young. The potentialities of this discovery for cattle breeding was effectively demonstrated by Polge & Rowson during the winter of 1951-52 and recorded by them in April, 1952.

I hope that these facts will provide the necessary background to the chronological matter given by Professor Emmens and his colleague.

As regards the other points raised in the letter, I need only say that when a technique has developed as rapidly as has the one under discussion, differences of opinion on details of procedure are inevitable and even desirable, and scarcely seem to justify the tone adopted by Professor Emmens and Mr. Blackshaw.—Yours faithfully, A. S. Parkes, National Institute for Medical Research, Mill Hill, London, N.W.7. *February 26th*, 1954.

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WILLIAM BROWN, M.R.C.V.S.

Sir,—I have read with deep regret, in your issue of January 9th which has just reached me, of the sudden death of my old friend Mr. William Brown. It was as a member of the Editorial Committee of 1933 that I first met him, and since then I have been in almost constant communication with him from Southern Rhodesia and Cape Town. He always showed me the greatest kindness, courtesy and consideration, and whenever I had a contribution to make to the *Record* I used to leave it entirely to his judgment to "blue pencil" as he thought fit. If he ever did so it was to my advantage. In him I feel I have lost not only a good friend but a very intimate link with the profession.

I shall be greatly obliged if you will convey to his widow and son my deep sympathy with them in their great loss.—Yours faithfully, L. E. W. Bevan, 22, Camp Road, Pinelands, Cape Town. *January 31st*, 1954.

Advertiser's Announcement

The Distillers Company (Biochemicals) Ltd. announce the availability of a 30 ml. silicone-treated vial of 'Distaquaine' Suspension (veterinary) as from March 1st.